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STRENGTHENING THE BUSINESS ENVIRONMENT TO ENHANCE COMPETITIVENESS: THE SWINE VALUE CHAIN IN CAMBODIA

A CIBER APPLICATION

AUGUST 2009

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CAMBODIA MSME 2/BEE PROJECT

**STRENGTHENING THE BUSINESS ENVIRONMENT TO ENHANCE COMPETITIVENESS:
THE SWINE VALUE CHAIN IN CAMBODIA**

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Executive summary

USAID's Micro Small and Medium Enterprise (MSME) Project has provided comprehensive assistance to several value chains in selected provinces in Cambodia, including the swine value chain. A key component of the Project seeks to remedy deficiencies in the business environment that affect the competitiveness of these value chains.

Sound analytical work of the issues faced by the Cambodia swine value chain reinforces expert assistance to farmers and processors. The Project sponsored a number of analytical studies that explored competitiveness challenges in the swine value chain, and an evaluation survey collected important information on both assisted and other enterprises in the pig value chain.

The purpose of this particular assignment was to deepen the understanding of the ways in which selected elements of the business environment affect the competitiveness of the swine value chain. Competitiveness is defined simply as the ability of producers, processors and distributors to provide a high-quality product to Cambodian producers at affordable prices. The assignment uses the framework of a tool recently developed for USAID to assess the Competitiveness Impacts of Business Environment Reform (CIBER) for targeted value chains. The CIBER tool offers pragmatic flexibility, depending on the stage of assistance provided. In the present context, much is already known about the major deficiencies in the business environment and the experience with appropriate interventions. In this case, the application of the CIBER tool can provide additional strategic guidance for assessing priorities and targeting interventions.

One of the major features of Cambodia's swine value chain is the fact that it forms part of a regional value network of the production and distribution of animal protein sources, including pork. For Cambodian producers and consumers, trends and events in neighboring countries, Thailand and Vietnam, shape domestic markets. More or less open borders mean that production and consumption decisions in one part of the network affect the others. And since Cambodia on the whole is not competitive with swine production in terms of quality and price in either Thailand or Vietnam, it has little control of the fate of its own swine industry.

The major challenges facing Cambodia's swine value chain have been well researched. They include unsophisticated demand conditions, an undeveloped distribution system that functions without any elements of a cold chain, a high level of intermediation that restricts competition, and poor factor conditions with respect to breed, feed and health of the herd. In contrast, the swine value chains in Thailand and Vietnam have achieved a much more advanced level of operations, and are continuing to improve rapidly. Since they are linked in a regional system through trading across borders of live swine, Cambodia's lack of competitiveness means a loss of income and opportunity.

The business environment plays a significant role in explaining the low level of organization of Cambodia's swine value chain, and in preventing progress. The 2008 report on the swine value chain reported the following major distortions to the value chain:

1. Provincial official complicity with the unregulated importation of swine;
2. Inconsistent application of the national legal and regulatory framework and imposition of arbitrary fees for inspection and licensing by local officials in the provinces;

3. Closed, syndicated or monopolistic systems of trading and animal slaughter in rural and remote areas where small-scale producers have few options for selling their finished pigs,
4. High informal regulatory costs and irregularities in procedures for importation of industry input, which are addressed in legislation but which require government-wide reform of customs and excise procedures.

The particular focus of a CIBER approach is to add to these insights by gauging the impact of efforts to improve the business environment on competitiveness—product quality and price. For the swine value chain, it is almost impossible to establish a sequence or list of possible policy innovations. One change cannot occur without the other elements. The recommended approach to obtain a quantitative ranking of particular strategic directions therefore is based on a simulation of the effects of policy changes on the economics of domestic hog operations. The complexity of these relationships makes it difficult to isolate the impact of reforming particular elements.

In an attempt to provide preliminary assessments of possible impacts of business environment reforms, this study uses a very simple simulation model, based on research done under the MSME II Project. The model links assumptions about key parameters and variables to estimates of the profitability of pig operations. Using that model, four scenarios (including one sub-scenario) were examined:

Scenario	Variable/parameter changed	Impact on net returns
Baseline scenario	Baseline estimates	[USD 664]
Leveling prices across provinces	Increase in pig price	53 percent
Sub-scenario: Lower trader margins	Lower margin carcass/pig	47 percent
Improved management	Increase in daily weight gain	78 percent
Improved hygiene	Lower mortality rate	6 percent
Improved breed	Change in average price	52 percent

Table of contents

EXECUTIVE SUMMARY	1
INTRODUCTION	1
The task	1
The approach	2
Organization of this assessment	2
CAMBODIA’S SWINE VALUE CHAIN	3
Overview of Cambodia’s pork chain	3
Some characteristics of the regional swine value network	5
Cambodia’s competitiveness in pig production	6
Consumption of pork	8
Imports of live swine	10
Price patterns	12
Levels of integration and coordination	13
THE ROLE OF THE BUSINESS ENVIRONMENT	14
Dimensions of the business environment	14
<i>Doing Business</i> in Cambodia	15
Impacts of the business environment at the level of the value chain	16
Options for response	17
EXPLORING PRIORITIES	18
A simulation model and initial assumptions	18
Assessing interventions: Leveling prices	20
Assessing interventions: Improved management	21
Assessing interventions: Improved hygiene	21
Assessing interventions: Improved breed characteristics	22
Concluding observations	22
BIBLIOGRAPHIC REFERENCES.....	23

Introduction

The task

Competitiveness depends first of all on the business acumen of firms. How they control costs, assure quality, and place their products (or services) in the market determines their competitive position. The business environment, shaped by government actions, may boost or—more often—undermine competitiveness. It may restrict choices, impose costs, or fail to provide critical support in meeting market demands. That link between the business environment and competitiveness has driven top-down reforms of the regulatory and administrative environment. However, it has proved difficult to link the type of reform to any real gains at the level of the economy as a whole. Without knowing the competitiveness yields of specific reforms, setting priorities becomes difficult.

At the level of an individual *value chain*, however, it is possible to trace the competitiveness impacts of business environment reforms. Competitiveness at this level is a concrete concept—the production and distribution of a good or service that meets both quality and price standards in the market. Thus, competitiveness is a *relative* concept, either at a given point in time with respect to competitors, or in terms of improvements in quality or cost over time.

Any effective value chain competitiveness strategy always addresses needed business environment reforms. In an attempt to provide better guidance for a systematic approach to that dimension of the strategy, USAID has sponsored the development of a pragmatic tool for assigning priorities for business environment reforms. This tool, by now known as the CIBER (Competitiveness Impacts of Business Environment Reforms) approach, comprises three phases: (1) work with the value chain stakeholders to identify major constraints and gaps in the business environment that affect the competitiveness of the value chain; (2) analyze the impact that reforms addressing these constraints and gaps would have on the competitiveness of the value chain at different stages, preferably in quantitative form; and (3) work with stakeholders again to identify the costs, such as political and administrative feasibility, of the reforms identified, and build a reform advocacy network targeting the priority reforms, as outlined in USAID (2008) and Millis and Charette (2009). The CIBER approach therefore represents a participatory cost-benefit method to identify and advocate specific reforms with a high payoff and a realistic chance of being implemented.

Applying the CIBER approach to the swine value chain in Cambodia can build on a sound understanding of the factors affecting its competitiveness. USAID's Micro, Small and Medium Enterprise (MSME II) Project has assisted pig farmers and other stakeholders for a several years. The Project has also commissioned a series of insightful studies of the issues and challenges facing the industry, including those related to the business environment. The analysis here adds to our understanding of the effects changes in the business environment could have on the competitiveness of Cambodia's pork chain.

The approach

To the extent possible, the CIBER approach seeks to quantify the impacts of business environment reforms on competitiveness *in a relative context*. One option is to compare the performance of the value chain under a particular policy regime with some reference case. For example, in a recent analysis of the impact of import licensing on meat prices and consumption in Moldova (Ernst and Neel, 2009), the reference case were prices and consumption (relative to income) in neighboring countries. That analysis suggested that Moldovan households consumed about 38 percent less meat and meat products than their per capita GDP suggested, and that they paid around 40 percent more for meat. The extra price burden corresponded to roughly 5 percent of per capita GDP; in other words, import monopolies imposed a significant “tax” on the population.

In the context of examining the impact of business environment reforms on the competitiveness of Cambodia’s swine value chain, comparing the performance to some reference case is difficult. Instead, the approach here is to work through a *simple simulation model* of a Cambodian pig operation that covers costs and revenues under different assumptions. Costs and revenues in turn are linked to specific elements of the business environment. For example, if the analysis finds significant price fluctuations across provinces that may be attributable to restrictions on transporting swine across provincial boundaries, varying the price assumptions would provide some guidance regarding the impact of loosening these restrictions. The results of these simulation runs are then extrapolated to the entire value chain.

Organization of this assessment

The remainder of this report is organized into three major sections. The first part briefly reviews Cambodia’s pork chain in the regional context. Earlier studies have presented a much more profound analysis of this aspect, but a brief summary, and any updates are useful for a stand-alone report. This section also reviews recent price patterns for pigs, and examines the impact of current imports of live pigs, primarily from Thailand. It also includes a brief examination of demand patterns.

The second section of the report briefly summarizes the relevant features of the business environment, again in a comparative context. It highlights Cambodia’s standing in international comparisons, focusing on specific aspects as they pertain to the swine value chain. The analysis focuses in particular on the lack of an integrated information infrastructure for the pork chain.

The concluding section examines the likely impact of changes in the business environment on the competitiveness of the swine value chain. It uses a simple simulation model, drawing on research by Sullivan (2007) to estimate net returns on a 20-pig finishing operation. The model is then used to explore the impact of different changes in the business environment on profitability.

The market for pork in Cambodia is highly dynamic. Many of the findings and statistics may well be obsolete within a few months or even weeks. However, the underlying weaknesses of the value chain and the principal strategic remedies are unlikely to be affected by current market fluctuations. But there are also some changes in the offing—particularly with respect to breed and feed, that may affect further priorities for reform.

Cambodia's swine value chain

Overview of Cambodia's pork chain

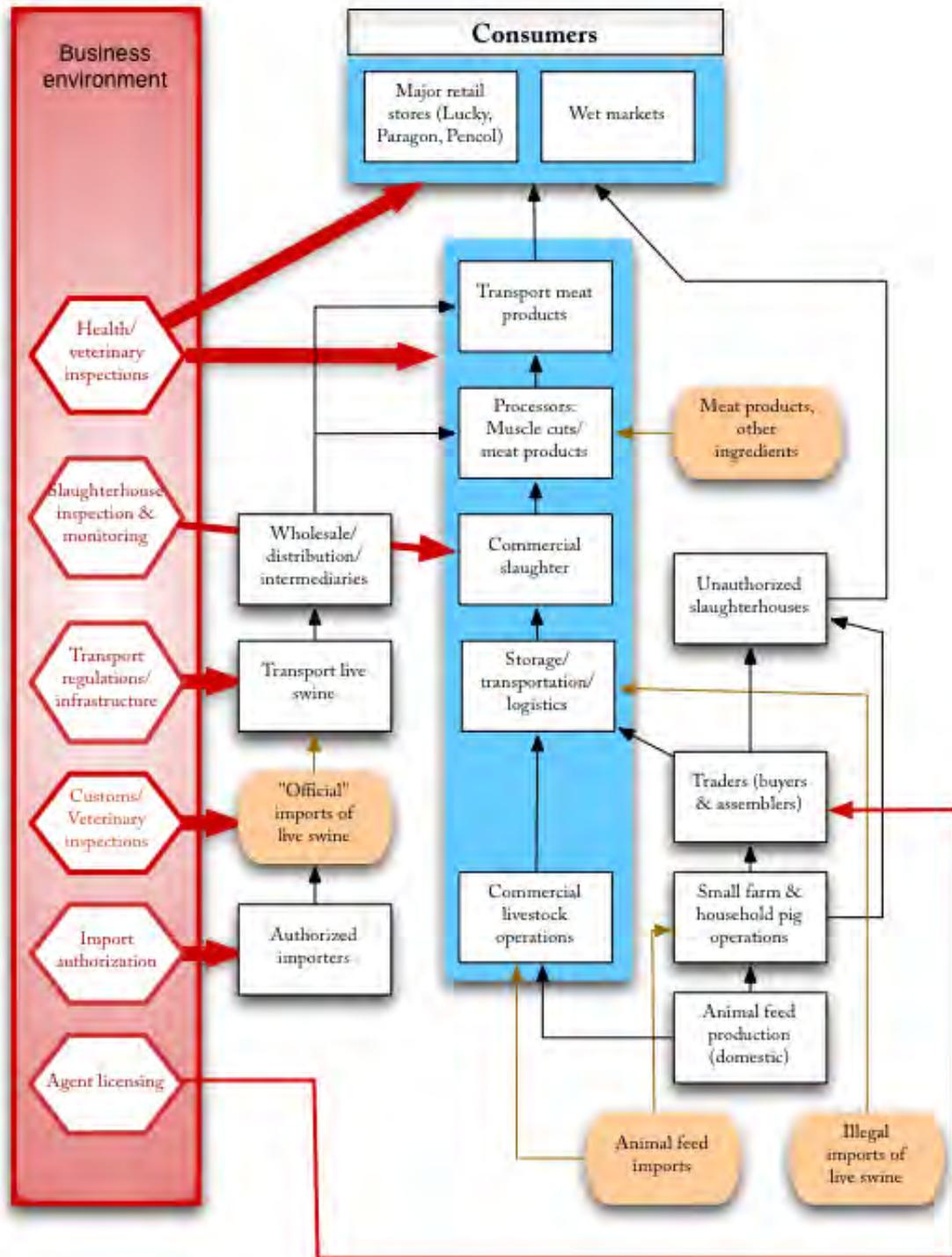
Figure 1 provides a brief overview of the swine value chain in Cambodia. This map is an adaptation of the one presented in Sullivan (2007, p. 14). It adds some aspects of the business environment as they interact with different stages and operations in the value chain. The red arrows show government interactions with the value chain, while the brown arrows refer to imports.

Any value chain is ultimately identified in terms of the end market, in this case Cambodian households who consume pork, either as fresh meat or in some processed form. Cambodian consumers obtain their meat from both wet markets and major retail chains in the cities. Much what is being offered in the wet markets arrives there basically as carcasses, and is cut up for sale there. These markets are not known for their compliance with food safety standards, a factor that presumably contributes to a fairly high spoilage rate, which is likely to raise prices for the meat actually sold.

Major retail chains, like *Lucky* or *Paragon*, are more likely to source their meat from commercial operations, such as *CP Cambodia*. They are more likely to offer packaged and individually priced cuts, as well as processed pork products. However, it appears that most of the pork products are actually imported, rather than from local production. Even domestic processors, however, prefer imported pork because of quality (leaner meat), consistency, and reliable availability.

Pig carcasses are transported from the slaughterhouses to processors and wholesale/retail trade, in a variety of ways, again typically without much regard for food safety standards (except by major producers with their own fleet).

Figure 1: Overview of the swine value chain in Cambodia



Source: Adapted from Developing the potential of the swine value chain in Cambodia (2007), p. 14

The “hubs” in the domestic value chain are the slaughterhouses, including unregulated and unsupervised “backyard” slaughterhouses. They receive truckloads of domestic and imported pigs and provide carcasses to the market. Imported live swine cross the borders on trucks, while most of the domestic production from small farmers is delivered through (licensed) traders and assemblers who buy up pigs from producers. An official from the government’s veterinary service is assigned to monitor commercial slaughterhouses. That official records the number of pigs slaughtered at each facility.

Small pig farmers feed their animals residues from agricultural activities like rice bran, mix their own animal feed with both residues and purchased inputs, or obtain animal feed from commercial operations, either as complete feed or in concentrate. They also obtain drugs and veterinary advice from input suppliers. In fact, input providers represent the most likely source of technical assistance with respect to animal feed and animal health, given the current deficiencies in the country’s government veterinary service.

Genetics for Cambodia’s swine value chain are poor. Larger companies are addressing this issue. *CP Cambodia* is running its own breeding operation and is using contract farming for fattening operations. A new company, *M’s Pig APMC (Cambodia)*, a member of the *Mong Reththy Group (MRT)*, has recently imported 600 breeding pigs from Great Britain as the core of a nucleus herd to be housed in the Prey Nop district of Sihanoukville city. The goal is to supply sows sufficient for producing 1.1 million slaughter pigs annually.

Other investments under consideration include feed mills and the expansion of processing facilities. *CP Cambodia* is reported to consider investments in an additional processing plant capable of producing over 500 kg/day of sausages and meatballs in Phnom Penh.

Some characteristics of the regional swine value network

It is actually misleading to treat Cambodia’s swine value chain as a distinct domestic entity. Cambodia’s pork chain in fact forms part of a *regional value network* of the production and distribution of sources of animal protein, including pork. For Cambodian producers and consumers, policies, trends and events in neighboring countries, Thailand and Vietnam, or in competing products shape domestic markets. The regional swine value network comprises the production, imports, slaughtering, and distribution, and consumption of pork, but it also includes government policies and input providers. Moreover, for an industry that relies largely on small farmers who may raise pigs as part of an diversification strategy, pork production must account for potential substitutes both for producers and consumers.

More or less open borders between Cambodia and its neighbors mean that production and consumption decisions, or the outbreak of disease or other health concerns, in one part of the network will trigger reactions throughout. Shifts in prices in one country are likely to have effects on price structures, consumption behavior and incentives elsewhere. Since Cambodian producers and processors are currently not competitive with swine production in terms of quality and price with their counterparts in either Thailand or Vietnam, the country has little control of the fate of its own swine industry. And without clear government policies with respect to trade management, incentives for investment and innovation for Cambodia’s swine value chain participants fluctuate greatly, magnifying risks. Cambodia’s swine value chain lacks clear development strategy that

engages both the industry and the government, preventing it from becoming competitive in a highly interactive regional pork value network.

On the production side, Table 1 provides a brief summary of the basic dimensions of the regional swine value network covering Cambodia and its neighbors, Thailand and Vietnam. Vietnam's swine herd is roughly 10 times the size of Cambodia's, with an economically active population in agriculture that is about five times that for Cambodia. That Vietnam's agriculture favors the production of swine of course reflects primarily differences in consumption patterns, discussed below. Perhaps the most revealing indicator is the "pig meat yield" in metric tons per hectare, where Thailand and Vietnam exhibit roughly the same performance level, but Cambodia's is significantly—about 30 percent—lower.

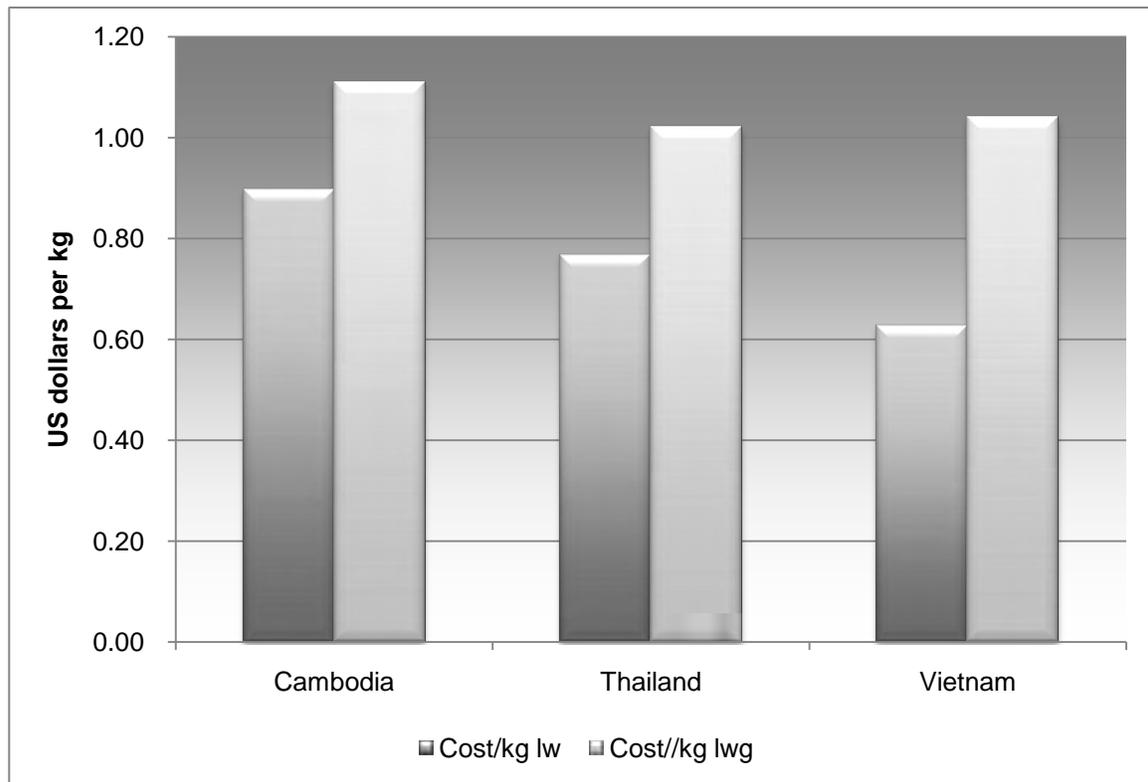
Table 1: Overview of the regional swine value network

Indicator	Year	Unit	Cambodia	Thailand	Vietnam
Herd					
Producing animals (pigs)	2006	1,000 head	2,715	10,755	36,000
Pig stocks	2006	1,000 head	2,741		26,855
Production					
Production quantity	2005	1,000 MT	127	687	2,288
Production quantity	2004	1,000 MT	123	680	2,012
Intensity of production					
Agricultural workforce	2004	1,000 persons	5,001	20,185	28,936
Pig meat yield/ag workforce	2004	MT/person	0.024	0.034	0.070
Pig meat yield	2006	MT/ha	46	65	67

Source: Psilos (2008)

Cambodia's competitiveness in pig production

The comparison of measures of pig meat yield already suggests a competitiveness gap. In a more detailed study, Vathana and Takeya (2003?) compared the cost characteristics of pig production in the three regional swine value network. Limiting their comparison to small (1-9 pigs) and medium-sized (10-50 pigs) operations, they estimated individual cost elements. The costs include the initial purchase price of the piglet, feed, drugs, and other non-feed costs. The cost per kg of live weight (lw) at the end of the fattening period is about 43 percent higher in Cambodia than in Vietnam, but the cost per kg of live weight gain (lwg) is only 9 percent higher than the best case, which is Thailand. Genetics are likely to play a role. The initial live weight for pigs in Vietnam is reported to be 2.6 times that for Cambodia (and about double that for Thailand).

Figure 2: Cost comparison for pig production

Based on this cost comparison, Vathana and Takeya (2003?, p. 9) conclude that “Cambodia is not yet competitive as a pig producer despite its cheap raw materials [for animal feed] ...” They cite the high costs of piglets and concentrate which is often imported in spite of Cambodia’s competitive advantage in producing key ingredients. They explain the survival of pig production in Cambodia in part with import tariffs that provide a measure of protection, in part by proximity to markets:

...Cambodian hog producers can survive with import tariffs on agricultural products and closeness to local markets. But they cannot enjoy high net income as their counterparts in Thailand do. (p. 10)

However, porous borders, along with scheduled tariff reductions, have whittled away at protection. And an emergency remedy, the total ban on imports of live swine in August 2007 caused a sharp increase in pork prices, since there was no time for Cambodia’s hog producers to respond. The ban was therefore lifted in March 2008, and replaced with a less-than-transparent import licensing scheme.

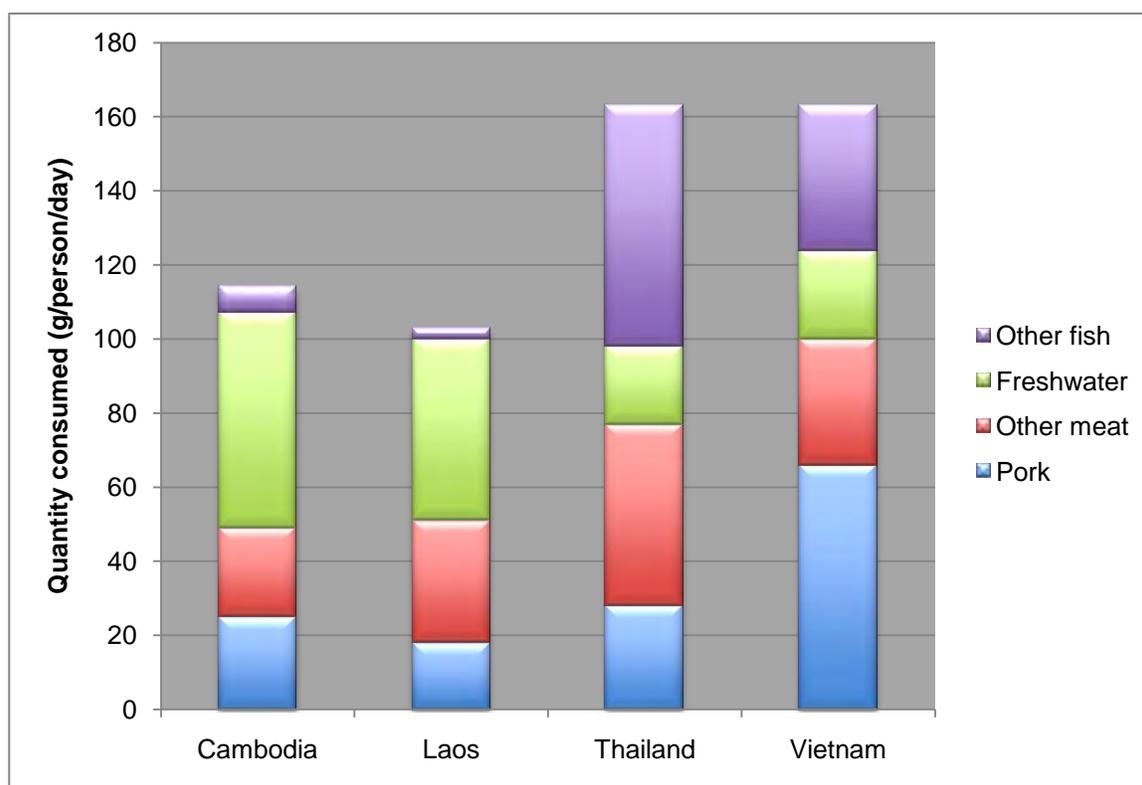
Cambodia does have a competitive advantage with respect to the production of ingredients for animal feed. Corn, soybean, cassava and fishmeal are available locally. Cultivation areas for corn and cassava are expanding, and local production is likely to meet domestic demand soon, with some portion left over for exports. *CP Cambodia*, which currently accounts for 60 percent of the commercial animal feed is using dried freshwater fish from Tonle Sap lake, fishmeal from Kampong Som and oil from the fish processing industry for protein.

However, domestic feed producers also face fierce competition from imported animal feed, and from other demand for the raw materials. Exporters of animal feed from Vietnam have recently enjoyed cost advantages over their Thai competitors as a result of exchange rate movements. The Thai baht has risen faster against the US dollar than the Vietnamese dong. There is also a rising demand for corn and cassava for other uses, especially from the cassava processing industry in the country itself, and traders from Korea, Thailand and China. As the price of pork rose in the wake of the import ban on live swine, prices for the ingredients of animal feed also increased, by some 50 percent in early 2008. In fact, for cassava the price per ton increased from USD 75 to USD 160 in 2008. The rising level of competition also contributed to these price increases. Anecdotal evidence suggests that investors are responding by encouraging expanded cultivation and building new feed mills.

Consumption of pork

The Food and Agriculture Organization (FAO) maintains a comprehensive database on food consumption patterns for the 2003-2005 time period. According to these data (confirmed by other sources), freshwater fish represents the principal source of animal protein for Cambodian consumers. But pork also represents an important part of the diet of the population. Figure 2 compares the consumption of protein from animal sources for four regional neighbors. Freshwater fish accounts for over 50 percent of animal protein for Cambodian households. In both Laos and Thailand, fish also accounts for over 50 percent of the animal protein diet, with ocean fish more important for Thailand. For Vietnam, pork accounts for over 40 percent of the total, and other meat for another 21 percent.

The FAO data suggest that per capita pork consumption in Cambodia is about 25 g/person/day. However, Sullivan (2007, p. 14) presents a calculation for Phnom Penh proper that suggests consumption may be double the FAO measure. According to his estimates, some 2,000 pigs are killed each day for the 1.3 million inhabitants of Phnom Penh. Each 75 kg of live weight times a 70 percent yield equals 42 kg, times an 80 percent meat yield equals 34 kg. Total daily consumption for the city is therefore equal to 2,000 times 34 kg or 68 metric tons, which translates into 52 g/person/day—actually more than double the FAO measure. Whether these estimates are in fact contradictory is difficult to determine. Income matters in determining the level of animal protein consumption, and higher incomes in Phnom Penh may explain at least part of the differences.

Figure 3: Consumption of animal protein by source

Source: FAO (average for 2003-2005)

However, to our knowledge, there has been no systematic analysis of the determinants of the demand for sources of animal protein, especially for pork, for any of the three countries. At a minimum, such studies need to relate consumption of specific food items to income and prices. Much of the food-related research for Cambodia has focused on food security aspects. For example, Sibirian (2009) uses data from the Cambodia Socio-Economic Survey 2003-2005 to illustrate differences in the incidence of food poverty, critical food poverty and undernourishment between urban and rural areas.¹ The levels of undernourishment are about the same for urban and rural households. However, the percentage of households in food poverty is significantly higher in rural areas (38 percent vs. 22 percent in urban areas), and the incidence of critical food poverty is double that for urban households (26 vs. 13 percent).

Generally, the expenditure on food as a percentage of appears to vary somewhere between 70 and 80 percent. It appears to have remained at that level, or have slightly increased since 1999. Gib-

¹ *Food poverty*, as measured by FAO, is based on the cost of a food basket corresponding to the average dietary energy requirement (ADER) that is the energy required to maintain a healthy life while performing a moderate level of physical activity. Critical Food poverty corresponds to the proportion of the population whose income is lower than the cost of food basket corresponding to the minimum dietary energy requirement (MDER). Undernourishment (food deprivation) is the proportion of the population below the minimum level of dietary energy consumption (DEC).

son (2003) has raised some questions about the reliability of these measures, however, since they depend on recall.

Anecdotal information suggests a shift in tastes consistent with trends in other countries toward leaner meat, but if there has been any systematic evaluation of the determinants of meat demand and changing tastes, they have not been available for this study. There are also assertions that Cambodian households prefer domestic pork to imports. But as far as can be determined, the evidence does not come from any detailed consumption surveys.

Imports of live swine

One of the major issues for the development of a competitive swine value chain in Cambodia is direct competition from imports coming from both Thailand and Vietnam. Treaties, such as the ASEAN Free Trade Area (AFTA, accession in 2000) or the WTO (accession in 2004), aim at lowering barriers to trade across borders by reducing or eliminating tariffs and non-tariff barriers. But they also allow for active trade management, such as protectionist measures, for limited time periods under certain conditions and with certain procedures, as long as unrestricted trade is shown to harm domestic industries. But these exceptions have to be strategically focused to achieve sustainable results with any temporary measures.

There is little doubt that surges of unregulated imports of live swine from Vietnam and Thailand have harmed the domestic industry. Psilos (2008) presents a sound analysis of these damages to the various elements of Cambodia's swine value chain (pp. 37-42). He estimates that for the period of mid-2006 to mid-2007, total unregulated imports of swine from Vietnam amounted to about 306 to 348 pigs per days from Vietnam, and 600 to 655 pigs a day from Thailand. The response by the RGC to prohibit any imports of live swine (imposed on 13 August 2007) shifted the burden to consumers, resulting in windfall gains for pig producers and traders. It did not accomplish much in the way of stimulating investment and innovation in the pork value chain, partly because it was lifted in less than a year.

It appears that the RGC has reached an agreement with Thailand for the import of some 800 pigs per day to be slaughtered in domestic slaughterhouses (which would correspond to between 80 and 88 percent of the level of unregulated imports reported by Psilos (2008)). The Government has awarded import licenses to four importers for 200 pigs per day each. As far as can be determined, the application process for these licenses can be charitably characterized as non-transparent. Rumors abound that the designated importers do not have much grounding in pig production and processing. Moreover, many industry observers believe that the actual volume of imports significantly exceeds the 800-head ceiling. According to Thailand's official trade statistics, that is, without counting any unregulated imports of live swine, the number exported to Cambodia in 2008 after the lifting of the import ban on March 27, 2008 corresponds to an average of 1,069 heads per day. Most of the rumors refer to anywhere between 2,000 and 3,000 head per day.

Table 2: Recorded imports of live pigs from Thailand

	2003	2004	2005	2006	2007	2008
Value (USD)	574,779	2,042,786	2,293,389	1,196,228	126,094	32,579,280
Number of pigs	12,774	29,772	36,816	19,836	2,273	292,623
Unit value/pig	45	69	62	60	55	111
Per kg (est'd)	0.48	0.74	0.67	0.65	0.60	1.20

Source: Global Trade Atlas: exports reported by Thailand destined to Cambodia.

Table 2 shows “official” export data for live swine from Thailand.² Up until 2007, reported (and recorded) live swine exports from Thailand to Cambodia were negligible. However, in 2008, these “official” exports ballooned. High domestic prices and diseases have recently kept (unregulated) exports from Vietnam to a minimum.

There is a grey area in assessing both regulated and unregulated imports. For example, if we accept the FAO statistic that per capita daily consumption is 25 g of “pigmeat,” the total daily consumption be somewhere around 356 MT of pork for the entire country. Using the measures that Sullivan (2007) employed for estimating consumption in Phnom Penh, the 160 MT would translate into roughly 4,700 pigs slaughtered per day. Another FAO statistic (for 2005) suggests an annual production of 127,500 MT of “indigenous pigmeat,” which would correspond to about 349 MT/day (or somewhere around 10,000 pigs slaughtered per day. In other words, using the daily consumption figure reported by the FAO, the country would be almost self-sufficient in pork production. Of course, these summary figures cannot be precise, but they do suggest that the lower values for total imports may be more appropriate.

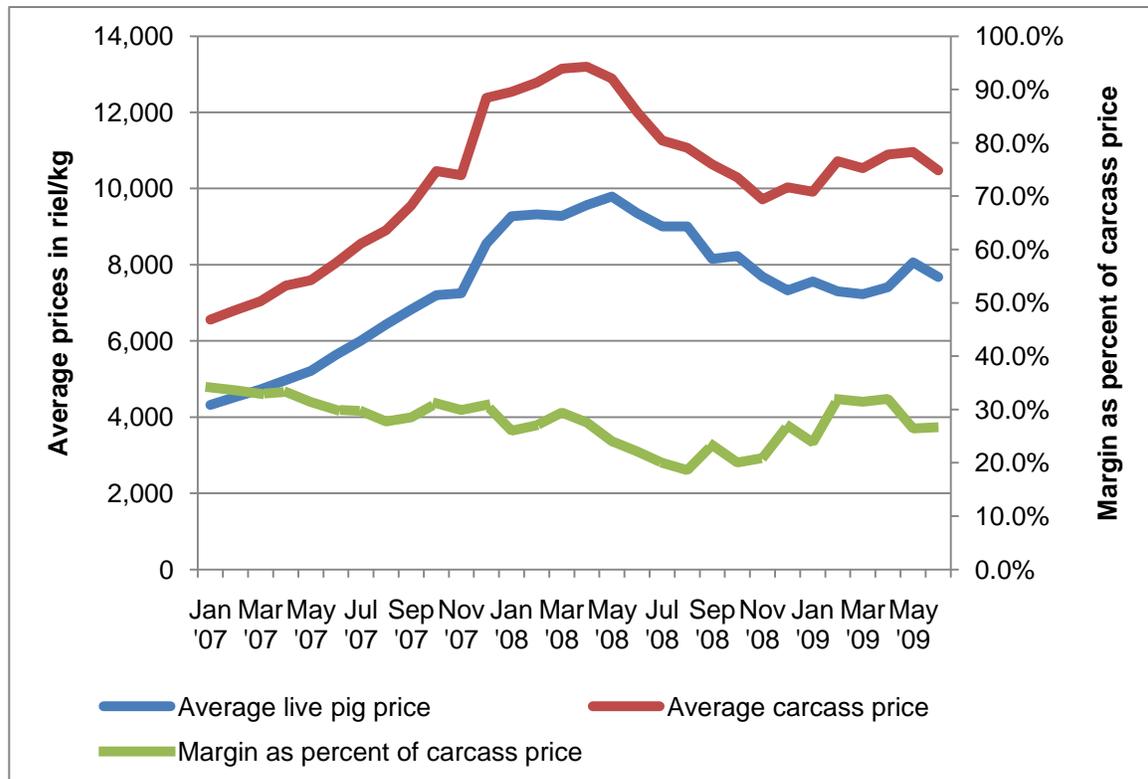
While exports live swine from Thailand boomed in 2008, so did the import bill. According to the implied unit costs reported, in USD/kg, they stayed fairly level between 2004 and 2007, roughly corresponding to the unit cost estimates derived by Vathana and Takeya (2003?). In 2008, however, the unit price per kg doubled, from USD 0.60 to USD 1.20. That imputed cost per kg for imports of live swine from Thailand corresponds to roughly KHR 5,100; the (unweighted) average of the costs for live swine in 2008 (data used for constructing Figure 5 below) is KHR 8,833. Imports of live swine from Thailand have a significant cost advantage, even after imposing any fees at the border.

² The data have been taken from the *Global Trade Atlas* (GTA), a proprietary database that offers two distinct advantages. First, complete data are available shortly after the respective trade year. Second, the trade data in local currencies are converted into US dollars using monthly exchange rates which matters in situations in which currencies fluctuate. However, the database presents statistics from a limited group, 71 countries at last count. While these countries include all of the major countries in the world economy, and provide mirror data on trade with virtually every other country (and the reporting countries), it omits data on trade between non-reporting countries. Since neither Cambodia nor Vietnam are “reporting countries,” the GTA does not cover trade between them.

Price patterns

The effect of the 2007 ban on swine imports is clearly reflected in the data on prices for live swine and carcasses in Cambodia. Figure 5 shows the monthly prices for the period January 2007 to June 2009.

Figure 5: Price trends for live pigs and pig carcasses, 2007-2009



Prices more than doubled between January 2007 and March 2008 when Order 1, an absolute ban on the import of live pigs imposed on August 13, 2007, was lifted (March 27, 2008). It is, however, remarkable that the imposition of the import ban apparently was perhaps not the actual trigger for the price increases. Prices had been steadily climbing from January 2007, and the imposition of the import ban only continued the upward trend. However, when the price per kg of swine carcass reached a level of over KHR 13,000, the impact on the Cambodian consumer was perceived as too severe and the import ban was lifted. Prices dropped, but not back to the level before the ban. And farmgate prices have since stayed about level at somewhere around KHR 8,000/kg, but carcass prices have climbed again to about KHR 11,000/kg, perhaps as traders were seeking reestablish their customary margins.³

³ Using retail price data for Phnom Penh, Psilos (2008) estimates that the price increases caused by the import ban translate into a per capita “tax” equivalent to over 2 percent of per capita GDP.

Figure 5 also shows the changes in the two price series which effectively denote the trader margin as a percent of the carcass price. Studies of the determinants of the farm-retail price spreads have suggested that the retail prices perform better in explaining the difference than traditional markup approaches. Obviously, the data shown in Figure 5 do not permit a statistical analysis, but the inspection of the relationship suggests that there has been no strong relationship. As carcass prices climbed, the margin (as percent) fell. After the lifting of the import ban, there has been a gradual increase in the percentage margin.

Another aspect about price patterns is the great variation across provinces. Given the difficulties of transporting live swine across provincial boundaries—which appears to be the product of protectionist measures implemented at the provincial level—there are significant variations in prices across provinces, as illustrated in Table 3.

Table 3: Carcass prices across provinces (KHR/kg)

Kind of carcass	Phnom Penh	Kampong Cham	Kratie	Prey Veng	Svay Rieng
Lean meat	15,000	15,000	11,000	18,000	12,000
Fat meat	13,000	12,000	9,000	15,000	8,000
Leg	10,000	9,000	8,000	10,000	8,000
Liver	15,000	10,000	12,000	18,000	12,000
Heart	18,000	12,000	12,000	18,000	12,000

Source: Prathna Preap, MSME II Project, personal communication

There may be explanations for some of these price differences beyond the restrictions on cross-province transport of live swine.⁴ However, a difference between KHR 8,000 and KHR 15,000 per kg for the “fat meat” carcass between Prey Veng and Svay Rieng also means that pig farmers in the latter miss out on economic opportunities.

Levels of integration and coordination

Psilos (2008) notes that Cambodia’s swine value chain is the most “intermediated” of the three countries in the regional swine value network. A high level of intermediation implies two consequences—a poorly functioning price finding mechanism (market distortions) and poor access to information.

The lack of an organized information infrastructure for Cambodia’s pork chain hampers competition and introduces levels of uncertainty that hamper investment and innovation. As the analysis

⁴ Restrictions on transport do not apply to imported pigs.

below shows, the most important element of a sustainable strategy to enhance the competitiveness of Cambodia's pork chain is the systematic promotion of improved access to information, including a better coordination of the chain as a whole, and lower risk as a result of a consistent approach to trade management and well-established [rice finding mechanisms].

Value chain coordination is essential in reducing the risks endemic to pork production, thereby promoting the kind of investment and innovation that Cambodia's pork chain requires to become fully competitive. Value chain participants themselves can play a major role in this process. Effective exchange of information throughout the network matters in the adoption of any innovation. Psilos (2008) emphasize the role that input suppliers can play in providing advice and guidance to farmers.⁵ Some countries, like Brazil, have adopted system of reverse coordination meaning that slaughterhouses often own a part or the whole production chain. Yet vertical integration is not necessarily the best solution. While some pig producers prefer contracts, or being part of an integrated operation, many producers favor the freedom to choose the companies they want to buy from and sell to. In any case, effective arrangements are beneficial, irrespective of the level of coordination.

The role of the business environment

Dimensions of the business environment

Government policies—laws and regulations and their application by the administrative and judicial systems at all levels—shape the business environment. But the business environment also reflects by institutional factors and social dynamics.

There is something of a growth industry in terms of measuring and comparing features of the business environment. One example is the continuing effort by the World Bank/IFC to compare a large number of economies (181 at last count). The *Doing Business* team uses ten indicators that seek to cover the full spectrum, as presented below. But the notion of the business environment is much broader. It also includes a range of other elements. For example, licensing requirements for particular activities shape markets by controlling access. Similarly, enforcement of weights and measures, a reliable quality infrastructure, health and environmental provisions, or procurement policies all set rules for businesses in the marketplace. Trade policies can directly affect supply patterns and market prices.

Features of the business environment affect competitiveness in different ways. For example, barriers to entry and exit of firms (starting a business and closing a business) are likely to lead to deadweight losses as the churning of any dynamic economy is disrupted. In other instances, dealing with the state imposes direct costs that ultimately are reflected in the price structure. These costs are typically the target of regulatory reform efforts.⁶ Similarly, costs imposed by Customs (preparation of documents, time required, etc.) also impose a burden that affects the overhead structure of operating costs. Administrative delays in areas such as reimbursements of value-

⁵ See also Makdissi and Wooden (2009)

⁶ The Standard Cost Model (SCM) that is widely used in European countries focuses on quantifying the administrative costs imposed by the legal and regulatory framework.

added tax (VAT) payments for exporters, or inappropriate handling of subsidies (or fees) also directly affect costs.

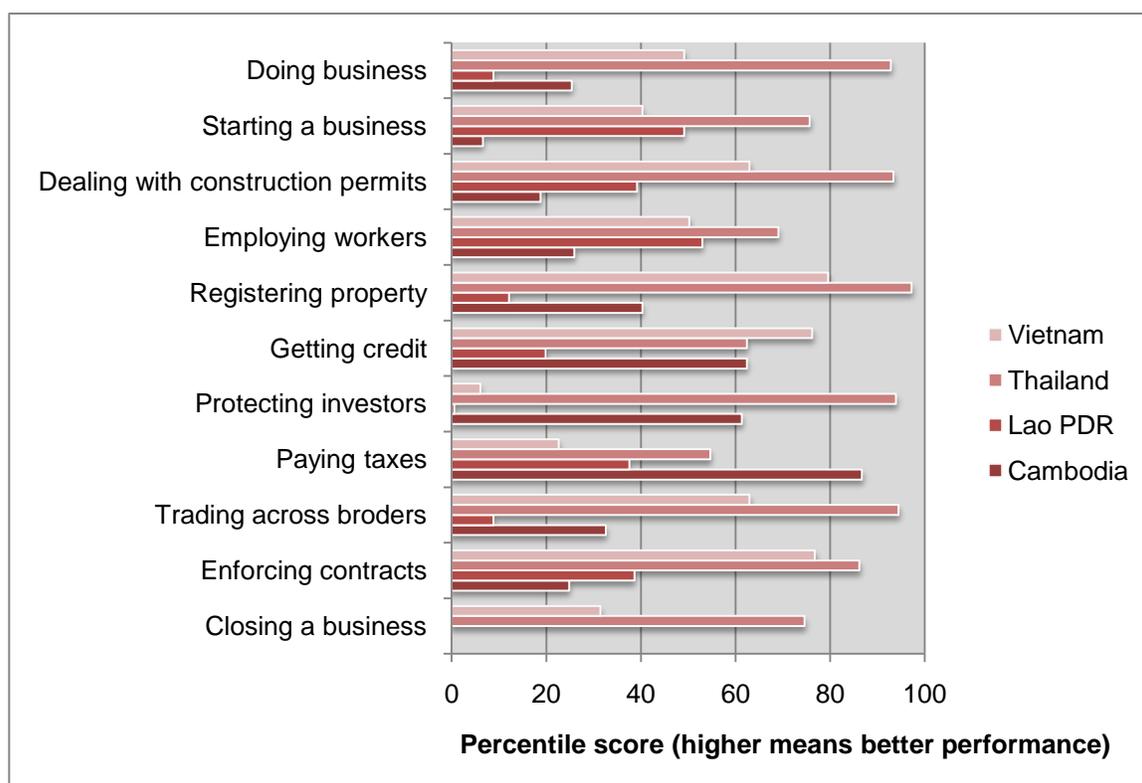
In other areas, the competitiveness impacts of the business environment are more indirect. To take the example of Customs: if Customs clearance takes too much time, markets where speedy responses matter may simply not be accessible. Regulations affecting truck or railway transportation may also cause delays that imply disruptions in access to markets. Poor roads may have the same effect. Government policy also influences the cost and reliability of utilities that generally have a major impact on competitiveness. The lack of a sound quality infrastructure—access to relevant technical regulations, enforcement of quality standards, and adequate protection of intellectual property rights—can put domestic producers at a serious disadvantage.

Finally, government can also affect price structures and incentives as an active participant in markets, either on the demand or supply side. For example, procurement of certain goods and services may send strong price signals to the rest of the market. And any direct state participation in productive enterprises, as in Vietnam for example, redefines markets.

Doing Business in Cambodia

The principal goal of the *Doing Business* exercise is to compare the costs or quality of different interactions between businesses and the government at all levels across countries. To obtain consistent results across a wide range of countries, the approach is to score different subindicators for ten standard tasks—, in effect through a simulation by people familiar with the particular environment. The price for consistency is often limited applicability to the local situation. For example, the case for “Starting a business” refers to a particular business that may not be at all representative of the majority of enterprises in the country. In another example, “Getting credit” depends primarily on the activities of credit bureaus, not necessarily the ease or difficulty of obtaining loans for different types of businesses. An internal World Bank evaluation has also criticized that the “Paying taxes” indicator combines measures of the administrative burden of paying taxes with tax policies.

The restrictive assumptions needed to ensure cross-country comparability blunt the use of these indicators as measures of *relevant* reforms. In effect, they provide more of a scorecard for top-down reforms than a guide to improving the competitiveness of a selected value chain. Even so, a brief inspection of the comparative standings of Cambodia and its regional neighbors highlights some of the major issues that also affect swine value chain participants. Figure 6 presents a brief summary, converting the rankings of the *Doing Business* reports (where less means better performance) to performance percentiles (where more means better).

Figure 6: *Doing Business* in the region (2009)

Source: Doing Business reports; neither Cambodia nor Laos have any applicable procedures for closing a business.

Overall, Cambodia ranks at about the 25th percentile in terms of the “ease of doing business,” better than Laos but far behind Vietnam (at about the 50th percentile) and especially Thailand which registers at the 92nd percentile. The lowest scores for Cambodia are in terms of “Starting a business” and “Closing a business,” the two measures that shape the business dynamics of the economy. The country is actually doing rather well with respect to “Getting credit,” often cited as a major issue in agricultural production. Its ranking on that indicator is the same as that for Thailand.

Cambodia ranks also low on “dealing with construction permits,” which may be a factor in decisions on business expansion, and in “enforcing contracts.” The latter may be of concern in developing structures in the value chain that are based on contractual arrangements among participants.

Impacts of the business environment at the level of the value chain⁷

Perhaps the most important weakness in terms of policies that shape the business environment for the swine value chain is the lack of a coherent strategic framework that could guide government

⁷ As noted, there is little to add to the analysis of the relevant aspects of the business environment in Psilos (2008). The summary here is simply designed to highlight the major findings in that report. It refers explicitly to the original text, without specific attribution

at all levels. As a result, policies tend to be reactive, adding to the economic and other risks inherent in hog production and distribution.

Generally, governments can only do so much to stimulate investment and innovation in key sectors. It is their task, however, to contribute as much as possible to a more predictable environment in terms of trade management for both swine and production inputs, provision of upstream services, including access to extension and veterinary services, reliable infrastructure services, and effective functioning of price finding mechanisms (internal markets). Governments around the world—and next door—have shown that a transparent and consistent strategic policy framework can create the space for private enterprise to flourish toward the competitive production and distribution of pork.

The “black letter law,” the laws and regulations on the books, is virtually neutral neither enables nor impedes the development of the pork chain. For example, with the accession to the ASEAN Free Trade Area (2000) and the WTO (2004), Cambodia has been engaged in changing its *formal* regulatory framework to comply with its obligations under these and related treaties.

What has emerged as a real roadblock on the path to improved competitiveness is the improper and inconsistent administration of these laws and regulations, however, has created significant roadblocks to achieving competitiveness. Arbitrary applications, unnecessary inspections, imposition of irregular payments, and non-transparent fee structures for licenses affect the economic health of the swine value chain and create additional risks. For example, arcane procedures for permits and inspections of transportation equipment, or barriers to the transport of live swine across provincial boundaries result in market fragmentation and necessitate often significant informal payments, raising costs for producers and processors and deterring investments.

The arbitrary character of different administrative arrangements and interpretations means that the business environment may be accommodating for some, and cumbersome for others. In effect, poor administration adds to the uncertainty caused by the absence of a strategic policy framework with respect to the swine value chain.

Options for response

The challenge for the government is to overcome these deficiencies and corruption at Cambodia’s borders and in the interior of the country. One option that has worked well in neighboring Vietnam and elsewhere is to encourage competition among provinces in terms of striving for a better business environment. The Provincial Business Environment Scorecard (PBES) is a step in the right direction, although it tends to focus more on “top-down” reforms at the local level. Complementing the PBES with a greater focus on business environment issues pertinent to the swine value chain could provide effective ammunition for the public-private dialogue already supported by the MSME II Project, and support the establishment of specific reform targets at the local level. But the challenge to the RGC in addressing these constraints to competitiveness remains huge.

Inconsistent government policies in terms of administration have not promoted the emergence of clear governance structures in Cambodia’s swine value chain. The challenge is to create a consistent strategic framework leading to improved coordination of the entire value chain, including the strengthening of an effective information infrastructure. The evolving consensus among experts and practitioners appears to be that competitive pork chains require *coordination*, rather than re-

liance on free market interactions. Ultimately, coordination ensures access to needed information that can reduce risk; market transactions among components of the value chain often involve information asymmetries, in particular when some participants have greater market power. For example, the licensing of traders in the Cambodian swine value chain in effect creates market power. Combined with collusion among traders, often reinforced through social networks, market power makes it difficult for producers to obtain reliable price information needed for their own operations. The licensing of agents and collectors reinforces a “guild mentality,” reinforced by social ties among traders, which distorts markets and interferes with transparent price finding mechanisms.

Slaughterhouses need to play a major role in the transition to a more competitive swine value chain. From a network-theoretic point of view, they are key hubs in the system, orchestrating their own network of local traders and collectors and serving the wholesale market. The challenge is to create the economic incentives for improvements that matter to operators. Clear, transparent regulation of the slaughterhouses to develop the value chain may be the ultimate goal, but it requires adequate administrative capacity that just is not there. One option may be an increased emphasis on branding, as Psilos (2008) recommends, but increased consumer pressure may also contribute.

Finally, the discussion has already touched upon the weaknesses in trade management procedures with respect to live swine and inputs, particularly breed, feed and medicine. Reliable information on these issues is hard to come by—beyond the obvious and somewhat counterproductive, like the imposition of the ban on imports of live swine. For example, the current system of import licensing is obscure; there is no information on the process of applying for or obtaining these licenses. Anecdotal information suggests that the authorities are treating applications for import licenses for breeding stock in an inconsistent manner, undermining effective competition.

As noted above, the existence of major price differences among provinces is a major indicator of market fragmentation as a result of administrative interference. It is difficult to see the rationale for prohibiting the transport of live swine across borders, but the results represent major losses to small-scale producers.

A continuing challenge, however, is the support of an environment that provides access to information needed for innovation on a sustainable basis. Input providers and *lead firms* represent one option. Larger operations can provide breed, feed, medicine and advice to small pig farmers, ensuring consistent quality, creation of consumer value, and efficient distribution. At the same time, however, government veterinary operations at the local level offer leverage for efforts to upgrade the production performance of small farmers.

Exploring priorities

A simulation model and initial assumptions

The main thrust of the CIBER approach is to assess the likely impact of particular reforms on value chain competitiveness, preferably in quantitative terms. However, while there is a good understanding of the needed reforms in the business environment for the swine value chain, many of the causal relationships are not fully traceable. In such a case, it may be necessary to estimate

proxy measures to sketch the magnitude of the likely impact. Ernst and Neel (2009) traced the impact of a monopolistic import licensing scheme for meat and meat products on consumption and prices. They found evidence of consumption below comparable standards and higher prices than in reference countries. The higher prices for meat in turn translated into a 5-percent “tax” on every Moldovan citizen—in other words, meat importers extracted a hidden transfer. Reforming the import licensing system would therefore generate benefits to all households consuming meat.

A similar approach may not work well in Cambodia, in part because of its position in a regional swine value network, in part because of unrecorded imports of swine, and in part because finding a sufficient number of reference countries poses some challenges. Instead, we can use a simple simulation model of a pig farm to get at the relative income effects of policy interventions that target different parts of the production cycle. The application of simulation models to pig farming has some tradition. Most of these models, however, focus on the effects of different feed strategies on growth.

Other simulation models for livestock operations are rooted in farming system research (FSR) to analyze best strategies for the farm. Zonderland and Enting (2003) outline a simulation model for sow farms and finisher pig farms, the *Pig Farm Manager*. The model as presented includes three modules— a general model with concerning the farm structure, farm management prices, and overhead costs, the housing module addressing construction required, and the feed module that is more in the tradition of assessing the impact of different feed strategies growth, body composition and mineral excretion of healthy growing/finishing pigs.

The simulation model used here is more basic. It is based on a “net returns” model presented by Sullivan (2007, pp. 9-10), examining the break-even point for a small farm fattening a batch of 20 piglets to slaughter weight. By his calculations, the cost per kg of live weight gain is USD 0.71, significantly below the USD 1.11 estimated by Vathana and Takeya (2003?) for some time in the early 2000s. In any case, Sullivan (2007) did not allow for inputs other than feed. Even so, his model proved reasonably compact and consistent for the exploratory simulations here.

Table 4: Simulation model : Initial assumptions

Parameter/Variable	Initial estimate
Number of pigs in farm operation	20
Initial price per piglet in USD	30
Average weight of piglets in kg	13
Target weight	90
Daily weight gain	0.65
Complete feed, no. of bags per pig per day	0.03
Complete feed, weight per bag in kg	30
Initial cost per bag (USD)	10
Rice bran, kg per pig per day	1.00
Rice bran, initial cost (USD)	0.073
Price per carcass (KHR, official price data)	10,584
Ratio of price of pig to carcass	0.71
Exchange rate (KHR/USD)	4,260
Inflation factor for feed	60%
Inflation factor for piglet price	50%
Mortality rate	2.5%
Prices: Fat to lean ratio (prices by provinces)	0.80

These initial inputs of course need to be vetted further by experts. For example, the price per carcass has been estimated as the (unweighted) average for the first six months of 2009. The ratio of the price for live pigs to carcass prices also is the average for the first six months. The model might also be expanded to include breeding operations (which are now included only in the cost of piglets). The “inflation factors” refer to the original estimates of feed prices provided by Sullivan (2007)

Under these assumptions, the total income from the pig fattening operations is USD 3,104, and the total cost is estimated to be USD 2,440. The “returns to labor, management, facilities and capital” therefore are estimated at USD 664 (which is close to Sullivan’s original estimate of USD 651).

Assessing interventions: Leveling prices

The carcass prices shown in Table 3 imply highly segmented provincial markets, presumably reflecting the apparent administrative ban on transport of live (domestic) pigs across provincial borders. These price differences reflect of course different demand patterns, as shaped by income and consumer preferences. In a fully integrated domestic market, the only differences among provinces should be equivalent to the transport cost to the market with the highest prices.

For example, assume that the RGC were to target the apparent prohibition of transport of live (domestic) swine across provincial boundaries. Suppose that as a result of allowing transport across borders, the price for the carcass were to go from the average of KHR 10,584 to

KHR 11,792, half the difference between the original estimate and the reported price for Phnom Penh. That change would add over 53 percent to the estimated “net returns,” bringing it to USD 1,019.

Obviously, this type of estimate is at best a rough approximation. If barriers to cross-provincial transport of live swine are removed, producers in low-price provinces will gain, while those who enjoy higher prices are likely to see a drop. The net effect depends on a number of factors, and it would take more analysis to put these estimates on firmer ground. Even so, the calculations illustrate the potential of using a fairly simple operations simulation model to assess the impact of changes in the business environment.

A similar impact might also apply to programs to disseminate price information more widely and reliably, or to encourage competition among traders. Either option would allow pig farmers to respond more effectively to changing market conditions, raising the price they can obtain in the market. For example, the margins between carcass and live pig prices in the last six months of 2008 shrank to 21.6 percent, possibly as a result of some greater competition. If we use the corresponding ratio between pig and carcass prices, the gain to the simulated pig farm in terms of the “net returns” would increase by over 47 percent. Greater competition among traders or better market information, however, also require a lowering of barriers to the transport of live domestic swine across provincial borders.

Assessing interventions: Improved management

Another strategic target would be to raise the productivity of the pig farmer through advice and provision of appropriate inputs. For example, a report quoted a representative of *CP Cambodia* that better information and management techniques might reduce the time for fattening of piglets to slaughter weight by 20 days. Better management information in terms of feed composition and other inputs would increase daily weight gain. In our simple model, the key parameter is therefore the “daily weight gain.” For example, raising the estimate for this parameter from 0.65 to 0.75 would reduce the total fattening time by 15 days, from 118 to 103 days. That change, all other elements being equal, would add over 78 percent to the original figure of USD 664, bringing it to USD 1,184.

This result lends some credence to Psilos’s argument that input providers can play a major role in changing the business environment by facilitating access to information. Given the statement from a representative of a lead firm in the sector that the fattening time can be reduced by more than the 15 days used here, achieving this kind of impact appears feasible.

Assessing interventions: Improved hygiene

The current assumptions imply a low mortality rate for the finishing operations, which needs to be vetted by experts in Cambodian swine operations. However, even with this current estimate, we can at least explore the implications of better hygiene as a result of improved access to veterinary care. If the rate of 2.5 percent were to be cut in half, to 1.25 percent, the “net returns” for the simulated pig operation would increase by 6 percent, to USD 704.

Assessing interventions: Improved breed characteristics

The data shown in Table 3 imply an unweighted average ratio between the carcass prices for lean and fat carcasses of 1.25 (or fat to lean of 0.80, as shown in the initial assumptions). If improved breeding can replace domestic breeds with their higher fat content, pig operations would gain. If the average carcass price increases by 12.5 percent, or half the average difference implied by the data shown in Table 3, “net returns” increase by 52 percent, to USD 1,009.

The introduction of breeding stock with a better lean yield will of course take time. But the gains are significant.

Concluding observations

The preliminary assessments suggest that the profitability of pig operations can rise significantly as a result of relatively small changes in underlying assumptions. Further analysis will be required to consolidate these estimates to increase reliability and plausibility. The four cases explored here suggest that the greatest gains may be possible by rapid improvements in management techniques to reduce the fattening period. Increased competition among input suppliers, supplemented by better extension can yield relatively quick returns.

The other element is the dismantling of restrictions on the transport of live domestic swine across provincial borders. While the gains are likely to be less than in some of the other cases, the creation of an integrated domestic market is essential to other improvements. The problem here is of course political and administrative feasibility. Since the restrictions provide opportunities for graft, they may be difficult to dislodge.

The model, an adaptation of little more than a back-of-the-envelope calculation, is at best at an early stage. The basic notion, however, can be developed further to assess the relative importance of possible interventions. Further refinements can build on existing models of pig farming systems, such as the one outlined by Zonderland and Enting (2003).

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